

NON-PUBLIC?: N
ACCESSION #: 9008240193
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Millstone Nuclear Power Station Unit 3 PAGE: 1 OF 3

DOCKET NUMBER: 05000423

TITLE: Manual Reactor Trip Due to Imminent Loss of Condenser Vacuum
EVENT DATE: 04/16/90 LER #: 90-013-01 REPORT DATE: 08/13/90

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 048

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Nelson D. Hulme, Senior Engineer, X5398

TELEPHONE: (203) 447-1791

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On April 16, 1990, at 1201 hours with the plant at 48% power in Mode 1, a manual reactor trip was initiated because of an anticipated turbine trip due to loss of condenser vacuum. Circulating Water Pump 3CWS-P1B was providing cooling water for Condenser Waterboxes "A" and "B". A rapid buildup of seaweed on "B" Traveling Screen resulted in an automatic trip of 3CWS-P1B due to high screen differential level. As the loss of cooling to two condenser bays would have resulted in a low condenser vacuum, a reactor trip was initiated. The reactor trip caused a Main Turbine and Generator trip in accordance with design.

The root cause of the event was inadequate administrative guidance in that debris was allowed to collect on the trash rack. During trash rack raking, seaweed broke free and clogged "B" Traveling Screen. Higher than normal seaweed influx and 130% flow due to cross connecting A & B

waterboxes contributed to the high differential level trip. The severe weather procedure was revised August 1, 1990 to require each circulating water pump to supply only the associated waterbox during severe weather. For corrective action, the trash racks high differential level alarm point has been lowered from 15 inches to 6 inches. Personnel have been instructed to closely monitor the trash rack water levels and clean the racks before levels exceed 4 inches.

END OF ABSTRACT

TEXT PAGE 2 OF 3

1. Description of Event

On April 16, 1990, at 1201 hours with the plant in Mode 1 at 48% power, at 572 degrees Fahrenheit and 2250 psia, a manual reactor trip was initiated because of an anticipated turbine trip due to loss of condenser vacuum. The plant had five of six circulating water pumps in operation with Circulating Water Pump 3CWS-P1A and its associated traveling screen shut down for repairs. Circulating Water Pump 3CWS-P1B was providing cooling water for Condenser Bays "A" and "B". A rapid buildup of seaweed on the "B" Traveling Screen resulted in an automatic trip of 3CWS-P1B due to high screen differential level. As the loss of cooling to two condenser bays would have resulted in a low condenser vacuum, a reactor trip was initiated. The reactor trip caused a Main Turbine and Generator trip in accordance with design. All safety systems were fully operable at the time of the trip, and all plant systems performed as designed in response to the trip.

Prior to the trip, reactor power was being increased at a rate of 3% per hour. In response to a "B" Trash Rack high differential level alarm (15"), an operator was sent to the intake to clear the debris from the rack. During the clearing effort, large amounts of seaweed broke free and swept past the trash rack onto the "B" Traveling Screen. The buildup of debris on the screen was too fast for the screen wash system to clear, so a high differential level trip of "B" Circulating Water Pump resulted.

At the time of the trip, operators verified that the Reactor Trip and Bypass Breakers were open, that all control rods were fully inserted, and that neutron flux was decreasing. A Feedwater Isolation was received due to low Average Reactor Coolant System temperature following the trip. An Auxiliary Feedwater actuation occurred as a result of a steam generator low-low level signal. These are normal plant responses following a trip. No additional

Engineered Safety Features were required or initiated. Plant stability was achieved at 1216 hours.

II. Cause of Event

The root cause of the event was inadequate administrative guidance in that debris was allowed to collect on the trash rack. When the operator proceeded to clean the rack, seaweed broke free and clogged "B" Traveling Screen.

There were two factors contributing to this incident. The first factor is the influx of seaweed which peaks in April - May and September - October. The Northeast Utilities Environmental Lab has reported the 1990 spring peak to be the highest in ten years. The second contributing factor was the increased flow through the "B" traveling screen. The "B" circulating water pump was aligned to supply flow to both the "A" and "B" waterboxes. This results in approximately 130% flow across the "B" screen.

III. Analysis of Event

This event is being reported in accordance with 10CFR50.73(a)(2)(iv), as an event or condition that resulted in manual actuation of an Engineered Safety Feature. Immediate notifications were performed in accordance with 10CFR50.72(b)(2)(ii).

The safety significance of the event is minimal as the trip was manually initiated because a turbine trip, due to loss of vacuum was imminent. Power level was at 56% just before the differential level increase was observed on the "B" Traveling Screen. When screen differential level reached the alarm setpoint (18"), a turbine load reduction was initiated in order to reduce the transient that the impending reactor trip would have on the plant. Power level was at 48% when 3CWS-P1B tripped on high differential level (30").

TEXT PAGE 3 OF 3

Operation of the Service Water system was not jeopardized due to the ratio of Service Water System flow (approximately 15,000 gallons per minute) to circulating water pump flow (approximately 150,000 gallons per minute) for one bay. When a circulating water pump trips, there is a reduction in flow resistance through the blocked screens. This allows differential level across the screens to return to an acceptable value.

IV. Corrective Action

The trash racks high differential level alarm point has been lowered from 15 inches to 6 inches. Personnel have been instructed to closely monitor the trash rack water levels and clean the racks before levels exceed 4 inches. This will minimize the debris which can break through the trash racks during raking operations.

The procedure which governs plant response to severe weather was revised August 1, 1990 to require each circulating water pump to supply only the associated waterbox if severe weather is predicted. This will ensure flow across the screen is limited to 100% flow.

In addition, the efficiency of the cleaning rakes has been improved. In the original design, the rake tips were located flush with the rack bars. The tips have since been designed to extend about one inch in between each of the bars.

V. Additional Information

Licensee Event Report (LER) numbers 86-035, 88-014, 88-024, 89-008, and 90-011 are similar in that a reactor trip due to a turbine trip resulted when fouling of the intake screens caused circulating water pumps to trip causing condenser vacuum to decrease. LER 90-011-00 identified design changes and maintenance actions that were taken to improve screen wash effectiveness in removing debris from the traveling screens. In addition, procedures have now been established to mitigate the consequences of seaweed buildup if the weather and tides are unfavorable, or the debris removal systems cannot adequately clear seaweed. Actions to be taken include the assignment of additional personnel to clear debris from the trash racks, and the reduction of power to a point where loss of some circulating pumps and subsequent turbine generator trip will not cause a reactor trip.

EIIS CODES

Systems Components

Circulating Water System - KE Pumps - P
Traveling Water Screens - SCN
Condenser - COND

NORTHEAST UTILITIES General Offices, Selden Street
The Connecticut Light And Power Company Berlin Connecticut
Western Massachusetts Electric Company
Holyoke Water Power Company P.O. BOX 270
Northeast Utilities Service Company HARTFORD, CONNECTICUT 06414-0270
Northeast Nuclear Energy Company (203) 665-5000

Re: 10CFR50.73(a)(2)(iv)

Aug. 13, 1990
MP-90-801

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Reference: Facility Operating License No. NPF-49
Docket No. 50-423
Licensee Event Report 90-013-01

Gentlemen:

This letter forwards Licensee Event Report 90-013-01 required to be submitted pursuant to 10CFR50.73(a)(2)(iv), any event or condition that resulted in manual actuation of the Reactor Protection System (RPS).

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

Stephen E. Scace
Director, Millstone Station

SES/NDH:mo

Attachment: LER 90-013-01

cc: T. T. Martin, Region I Administrator
W. J. Raymond, Senior Resident Inspector, Millstone Unit Nos. 1, 2
and 3
D. H. Jaffe, NRC Project Manager, Millstone Unit No. 3

*** END OF DOCUMENT ***
